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THE MEASUREMENT OF INSTITUTIONAL

DISCRIMINATION

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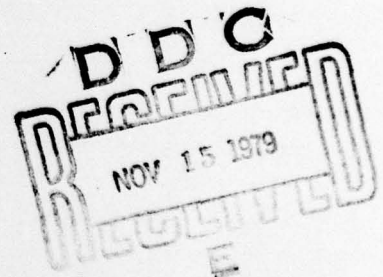
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THE MEASUREMENT OF INSTITUTIONAL DISCRIMINATION

This paper presents a method for measuring institutional discrimination, and presents examples of its use. Despite assertions by Ginsburg,[1] Moskos,[2] and others that the goal of racial equality is closer to fulfillment in the armed forces than in any other American Institution, critics of the military continue to point to discrimination against black servicemen and women within the military establishment. Weigert's analysis of a survey of 459 black American soldiers stationed in Germany in 1970 found that 41 percent felt that there were better opportunities for blacks in civilian institutions than in the military. An additional 39 percent rated the two about equal, and only 20 percent felt they had better prospects in the military. An ARI survey of 3,845 enlisted personnel, conducted worldwide, in 1972, presented a somewhat more positive view of the Army compared to civilian institutions, although the data are not directly comparable. Nineteen percent of the black respondents in the ARI survey felt that race problems were worse in the Army than in the rest of society, and 46 percent felt that they were about the same. However, in comparing the treatment of blacks and whites within the Army, 72 percent of the black respondents felt that blacks are treated worse than whites in the Army, and only 1 percent felt that blacks were treated better.

Looking at social structure rather than survey responses, Janowitz and Moskos point out that although the military has provided a place of employment for disproportionately large numbers of blacks, these personnel have been concentrated even more disproportionately in the ground combat forces, and have been underrepresented in the officers corps.[5] It is difficult to say whether the egalitarianism of basic employment opportunities offsets structural conditions that might require a particular segment of the population to sustain disproportionately high casualties in a combat situation, while being precluded from advancement opportunities within the institution.

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[1] Ginzberg, E. The Negro Potential (New York: Columbia University Press, 1961), p. 61.

[2] Moskos, C. C., Jr. The American Enlisted Man (New York: Russell Sage Foundation, 1970), p. 121.

[3] Weigert, K. M. "Stratification, Ideology, and Opportunity Beliefs among Black Soldiers," Public Opinion Quarterly 38 (Spring, 1974), pp. 57-68

[4] Nordlie, P. G., and Thomas, J. A. Black and White Perceptions of the Army's Equal Opportunity and Treatment Programs. Technical Paper 252, US Army Research Institute for the Behavioral and Social Sciences (May, 1974).

[5] Janowitz, M., and Moskos, C. C., Jr. "Racial Composition of the All-Volunteer Force, "Armed Forces and Society" 1 (Fall, 1974), pp. 109-123.

At issue are not individual acts of discrimination against individual servicemen who are members of a racial minority. Rather, the broader issue is whether a major social institution has been discriminating against a large subgroup of people for an extended period of time. We are concerned with the pattern of treatment of that subgroup by the Army, and the consequences of such treatment. The concern is with __institutional discrimination__.[6] While the current model and data deal with the black minority in the US Army, it is important, in an era of expanding ethnic consciousness among non-black ethnic minorities in the United States, and of increased utilization of women in the labor force, to recognize that the model can be used to study institutional discrimination against any minority group. Moreover, it can be used in other social institutions as well.

DEVELOPMENT OF A MODEL OF INSTITUTIONAL DISCRIMINATION

Institutional discrimination refers to a pattern of treatment of a subgroup of the population that persists over time. Thus, neither the overrepresentation of members of that subgroup among the recipients of a particular undesirable treatment at one point in time, nor their underrepresentation among the recipients of a desirable treatment may be taken as indicative of institutional discrimination, although these acts may clearly be discriminatory. A matix of such treatment over time, however, can be used to identify patterns of discrimination within an institution.

Let P be the matrix of the proportion of members of a subgroup eligible or available to receive a particular treatment j in a particular year i.

$$
\begin{bmatrix}
P_{11} & P_{12} & \cdots & P_{1m} \\
P_{21} & P_{22} & \cdots & P_{2m} \\
\cdot & \cdot & \cdots & \cdot \\
\cdot & \cdot & \cdots & \cdot \\
\cdot & \cdot & \cdots & \cdot \\
P_{n1} & P_{n2} & \cdots & P_{nm}
\end{bmatrix} = P
$$

Let A represent the matrix of the total number of members of the institution who in year i receive a particular treatment j.

$$
\begin{bmatrix}
a_{11} & a_{12} & \cdots & a_{1m} \\
a_{21} & a_{22} & \cdots & \cdot \\
\cdot & \cdot & \cdots & \cdot \\
\cdot & \cdot & \cdots & \cdot \\
\cdot & \cdot & \cdots & \cdot \\
a_{n1} & a_{n2} & \cdots & a_{nm}
\end{bmatrix} = A
$$

[6] Carmichael, S., and Hamilton, C. __Black Power__ (New York: Random House, 1967). See also Knowles, L. L., and Prewitt, K. (Eds.) __Institutional Racism in America.__ Englewood Cliffs, N. J.: Prentice-Hall, 1969.

Then, were no discrimination to exist, the number of members of the subgroup expected to receive treatment j in year i would be the product of the multiplication of corresponding elements of P and A, which are matrices of the same order (not the result of multiplication of the matrices P·A).

$$e_{ij} = p_{ij} a_{ij}$$

E, then, is the matrix of the number of members of a subgroup expected across multiple treatments and multiple years under conditions of non-discrimination.

$$\begin{bmatrix} e_{11} & e_{12} & \cdots & e_{1m} \\ e_{21} & e_{22} & \cdots & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ e_{n1} & e_{n2} & \cdots & e_{nm} \end{bmatrix} = E$$

O is the matrix of observed outcomes for the subgroup across years i, i = 1 to n, and across treatments j, j = 1 to m. In the absence of discrimination, $O_{ij} \cong e_{ij}$, and $O \cong E$.

$$\begin{bmatrix} o_{11} & o_{12} & \cdots & o_{1m} \\ o_{21} & o_{22} & \cdots & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ o_{n1} & o_{n2} & \cdots & o_{nm} \end{bmatrix} = O$$

Deviations from this equality, i.e., underrepresentation or overrepresentation of members of a subgroup in receiving a particular treatment can be computed on the basis of the ratio of observed to expected treatments. This ratio can be multiplied by 100 to convert it to a percentage, and 100 can be subtracted from the product so that $r_{ij} = 0$ when $o_{ij} = e_{ij}$.

$$\begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ \cdot & \cdot & \cdots & \cdot \\ r_{n1} & r_{n2} & \cdots & r_{nm} \end{bmatrix} = R$$

where $r_{ij} = 100 \dfrac{o_{ij}}{e_{ij}} - 100.$

Matrix R defines the pattern of institutional behavior. Each element r_{ij} defines the level of overrepresentation or underrepresentation of the subgroup in receipt of treatment j in year i. Thus, r_{ij} may be regarded as a representation index. Where $o_{ij} = 0$ and $e_{ij} > 0$, $r_{ij} = -100$. Where $o_{ij} > 0$ and $e_{ij} = 0$, we shall define r_{ij} as 100.

Let us exemplify the model by looking at two of the variables in the Janowitz and Moskos critique of the all-volunteer Army, cited above: black underrepresentation among officers and overrepresentation in combat arms.

BLACK OFFICERS

Matrix P for officer strength should reflect, for O-1s, the proportion black in the pool of persons eligible for Army commissions. For all higher grades, the entries should be the proportion black at the next lowest rank plus the proportion black at the given grade who are eligible to continue service at that grade. To avoid a great deal of arithmetic, we will estimate p_{ij} by the proportion black among Army commissioned officers in each year i, recognizing that this estimate masks variations in black accession and retention rates among officer cohorts. That such differences exist is reflected in the variation in p_{ij} for different years.

	O-1	O-2	O-3	O-4	O-5	O-6	O-7+	
1962	.032	.032	.032	.032	.032	.032	.032	
1964	.034	.	.	.	.	.	.034	
1966	.037	.	.	.	.	.	.037	
1968	.034	.	.	.	.	.	.034	= P
1970	.034	.	.	.	.	.	.034	
1972	.039	.	.	.	.	.	.039	
1973	.042	.042	.042	.042	.042	.042	.042	

Matrix A for officers is defined by the total number of personnel serving in grade j in year i.

18,559	14,928	29,397	17,100	12,309	5,127	495	
20,357	16,240	31,902	17,770	12,552	5,203	509	
20,848	18,105	34,153	19,512	14,273	5,616	518	
26,374	39,099	35,740	23,749	16,541	6,357	520	= A
20,180	29,879	44,468	22,831	14,610	6,023	512	
11,274	15,305	38,894	20,004	12,324	5,595	508	
12,476	13,541	31,211	18,167	11,888	5,218	488	

Multiplying the corresponding elements in A and P, $p_{ij}a_{ij}$, produces expectation matrix E.

- 4 -

$$
\begin{bmatrix}
594 & 479 & 941 & 547 & 394 & 164 & 16 \\
698 & 552 & 1,085 & 604 & 427 & 177 & 17 \\
771 & 670 & 1,264 & 722 & 526 & 208 & 19 \\
897 & 1,329 & 1,215 & 807 & 562 & 216 & 18 \\
686 & 1,016 & 1,512 & 776 & 497 & 205 & 17 \\
440 & 597 & 1,517 & 780 & 481 & 218 & 19 \\
524 & 569 & 1,311 & 763 & 499 & 219 & 21
\end{bmatrix} = E
$$

E, in turn, can be compared to the observed numbers of blacks serving in grades O-1 through O-7 between 1962 and 1973, presented in matrix O.

$$
\begin{bmatrix}
421 & 650 & 1,532 & 428 & 117 & 6 & 0 \\
541 & 589 & 1,627 & 618 & 141 & 10 & 0 \\
570 & 580 & 1,582 & 1,012 & 301 & 16 & 0 \\
616 & 1,129 & 1,322 & 1,302 & 620 & 42 & 1 \\
332 & 734 & 1,628 & 1,193 & 684 & 71 & 1 \\
247 & 519 & 1,500 & 1,008 & 650 & 86 & 9 \\
459 & 478 & 1,283 & 932 & 632 & 102 & 12
\end{bmatrix} = O
$$

Representation indexes for each year i and each grade j can then be computed by the formula

$$
r_{ij} = 100\,\frac{o_{ij}}{e_{ij}} - 100
$$

yielding representation matrix R. [7]

$$
\begin{bmatrix}
-29 & +36 & +63 & -23 & -70 & -96 & -100 \\
-23 & +7 & +50 & +2 & -67 & -94 & -100 \\
-26 & -13 & +25 & +40 & -43 & -92 & -100 \\
-31 & -15 & +9 & +61 & +10 & -81 & -94 \\
-52 & -28 & +8 & +54 & +38 & -65 & -94 \\
-44 & -13 & -1 & +29 & +35 & -61 & -53 \\
-13 & -16 & -2 & -3 & +27 & -53 & -41
\end{bmatrix} = R
$$

[7] This matrix is from Segal, D. R., and Savell, J. M. "Research on Race Relations in the Army." Paper presented at the Smithsonian Institution Conference on Survey Alternatives, Santa Fe, New Mexico, 22-24 April 1975.

In the case of proportional representation r_{ij} would be zero, although in reality we expect random variations around zero. During the period 1962-1973 represented in matrix R black underrepresentation decreased markedly among colonels and general officers, and blacks came to be overrepresented among lieutenant colonels. Virtual representation was achieved at the grades of captain and major.

The figures in R are probably inflated by the gross way we have estimated e_{ij} in these computations, masking the differences in cohort accession occasioned by the Vietnam War. For example, the large number of black junior officers brought in during the Vietnam War expansion were obviously not eligible to be general officers in the 1960's and 1970's. Nonetheless, the figures exemplify the way the representation index can be used to reflect patterns of discrimination over time. Moreover, the simple average $\sum_{i=1}^{n} r_{ij}/n$ provides a summary measure of discrimination for each year i and changes in this average reflect changes in discrimination patterns over all outcomes j included in the matrix. Thus, the pattern of representation presented in matrix R may be summarized as in Table 1. The data suggest that blacks have been underrepresented among the several officer grades during the period

Table 1

MEAN REPRESENTATION INDEXES FOR BLACK OFFICERS

Year	Representation Index
1962	-31
1964	-32
1966	-30
1968	-20
1970	-20
1972	-15
1973	-14

under analysis, although the level of underrepresentation has decreased markedly. Utilization of different estimates of e_{ij}, or use of weighted means would change the absolute magnitude of the representation indexes and the means but the basic pattern would remain.

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Matrix P' presents the proportion of Army enlisted personnel who were black in alternate years between 1964 and 1972. Matrix A' presents

$$
\begin{bmatrix} .118 \\ .124 \\ .126 \\ .135 \\ .175 \end{bmatrix} = P' \qquad\qquad \begin{bmatrix} 187,777 \\ 230,904 \\ 277,600 \\ 216,782 \\ 142,082 \end{bmatrix} = A'
$$

the actual number of enlisted personnel serving in infantry, gun crews, and allied specialties in the same years. Multiplying the corresponding elements yields expectation matrix E', which can be compared with the actual number of blacks in these combat specialties, O', to produce representation indexes for this variable. Whereas the negatives r_{ij}s in R reflected underrepresentation of blacks in desirable positions

$$
\begin{bmatrix} 22,158 \\ 28,632 \\ 34,978 \\ 29,266 \\ 24,864 \end{bmatrix} = E' \qquad \begin{bmatrix} 36,292 \\ 39,649 \\ 43,657 \\ 33,948 \\ 27,241 \end{bmatrix} = O' \qquad \begin{bmatrix} +64 \\ +38 \\ +25 \\ +16 \\ +10 \end{bmatrix} = R'
$$

in the Army, the positive entries in R' reflect overrepresentation of blacks in positions that are regarded by some as being of high risk, and involving few skills that can be utilized in the civilian economy. Again we find a trend toward representation, but also the persistence of a pattern that, in the aggregate, can be regarded as institutional discrimination.

DISCUSSION

This paper presented the representation index used in the measurement of institutional discrimination, and exemplified its computation using data on the representation of blacks among officers and among enlisted combat specialties. Blacks were found to be underrepresented in the former case, and overrepresented in the latter, although the trend has been toward greater representativeness. Future publications will present representation indexes computed on a wider range of variables, to generate a fuller picture of the role of blacks in the Army. The representation index can be used to measure the role of other minority groups in the Army, and can be used in other institutional settings as well.

The utilization of the index in this paper makes use of unweighted means in cumulating representation indexes for specific years. Where the same set of treatments is considered in each year this procedure seems appropriate. When changes are made in the set of treatments considered, however r_{ij} might be weighted by e_{ij} to adjust for the absolute number of people affected by discrimination.